

Appln. Serial No. 09/714,082
Amendment Dated September 13, 2004
Reply to Office Action Mailed July 16, 2004

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims:

- 1 1. (Cancelled)
- 1 2. (Currently Amended) The method of claim ~~[[1]]~~ 32, wherein establishing the
2 secure link comprises establishing a virtual private network session.
- 1 3. (Currently Amended) The method of claim ~~[[1]]~~ 32, wherein establishing the
2 secure link comprises establishing a link protected by an Internet Protocol Security protocol.
- 1 4. (Original) The method of claim 3, wherein sending the at least one ping message
2 comprises sending at least one Internet Control Message Protocol message.
- 1 5. (Currently Amended) ~~The method of claim 4~~ A method of determining if a link is
2 alive, comprising:
3 establishing a secure link between a first node and a second node according to a
4 security protocol;
5 sending at least one ping message targeting the second node over the secure link,
6 the at least one ping message defined outside the security protocol; and
7 monitoring for at least one ping reply to determine if the secure link is alive,
8 wherein sending the at least one ping message comprises sending at least one
9 Internet Control Message Protocol message.
- 1 6. (Currently Amended) The method of claim ~~[[1]]~~ 32, wherein establishing the
2 secure link comprises establishing the secure link between first and second nodes each
3 comprising a security gateway.

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1 7. (Original) The method of claim 6, further comprising sending at least one ping
2 message targeting another node behind the second node.

1 8. (Previously Presented) The method of claim 7, further comprising monitoring for
2 at least one ping reply from the other node.

1 9. (Currently Amended) The method of claim [[1]] 32, further comprising tearing
2 down the secure link if the secure link is determined not to be alive.

1 10. (Original) The method of claim 9, wherein tearing down the secure link comprises
2 tearing down a security association according to an Internet Protocol Security protocol.

1 11. (Cancelled)

1 12. (Currently Amended) The method of claim [[11]] 34, wherein establishing the
2 secure link comprises establishing a secure link protected according to an Internet Protocol
3 Security protocol.

1 13. (Currently Amended) The method of claim [[11]] 34, wherein establishing the
2 secure link comprises establishing a virtual private network session.

1 14. – 15. (Cancelled)

1 16. (Currently Amended) The method of claim [[15]] 34, wherein sending the at least
2 one ping message comprises sending an Internet Control Message Protocol message.

1 17. (Original) The method of claim 16, wherein establishing the secure link comprises
2 establishing a secure link protected according to an Internet Protocol Security protocol.

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1 18. (Cancelled)

1 19. (Currently Amended) The system of claim [[18]]] 36, wherein the security
2 protocol comprises an Internet Protocol Security protocol.

1 20. (Currently Amended) ~~The system of claim 18~~ A system for communicating
2 between a network element and a remote node, comprising:
3 a security module adapted to establish a secure link with the remote node, the
4 secure link having a security mechanism according to a security protocol; and
5 a keep-alive module adapted to send at least one ping message over the secure
6 link to the remote node, the at least one ping message defined outside the security protocol,
7 wherein the at least one ping message comprises an Internet Control Message
8 Protocol message.

1 21. (Currently Amended) The system of claim [[18]] 36, further comprising:
2 an interface to a packet-based network, the secure link established over the
3 packet-based network; and
4 a layer to control communications over the packet-based network.

1 22. (Original) The system of claim 21, wherein the layer comprises an Internet
2 Protocol layer.

1 23. (Currently Amended) The system of claim [[18]] 36, wherein the keep-alive
2 module is adapted to further monitor for at least one ping reply responsive to the at least one ping
3 message to determine if the secure link is alive.

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1 24. (Original) The system of claim 23, wherein the security module is adapted to tear
2 down a security association of the secure link if the secure link is not alive.

1 25. (Original) The system of claim 24, wherein the security association comprises an
2 Internet Protocol Security protocol security association.

1 26. (Currently Amended) The system of claim ~~[[18]]~~ 36, wherein the keep-alive
2 module is adapted to further monitor for at least one ping reply responsive to the at least one ping
3 message to determine if the secure link is alive, the system further comprising a module adapted
4 to establish a link over a secondary communication network if the secure link is not alive.

1 27. (Cancelled)

1 28. (Currently Amended) The article of claim ~~[[27]]~~ 38, wherein the instructions
2 when executed cause the controller to further establish an Internet Protocol security association
3 for the secure link.

1 29. (Original) The article of claim 28, wherein the instructions when executed cause
2 the controller to tear down the security association if the controller does not receive the at least
3 one ping reply.

1 30. (Original) The article of claim ~~[[27]]~~ 38, wherein the controller is part of the first
2 node.

1 31. (Cancelled)

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1 32. (Currently Amended) ~~The method of claim 1~~ A method of determining if a link is
2 alive, comprising:
3 establishing a secure link between a first node and a second node according to a
4 security protocol;
5 sending at least one ping message targeting the second node over the secure link,
6 the at least one ping message defined outside the security protocol; and
7 monitoring for at least one ping reply to determine if the secure link is alive,
8 wherein sending the at least one ping message comprises sending the at least one
9 ping message protected according to the security protocol.

1 33. (Currently Amended) The method of claim [[1]] 32, wherein the security protocol
2 comprises an Internet Protocol Security protocol (IPsec), and wherein sending the at least one
3 ping message comprises sending the at least one ping message encrypted according to an IPsec
4 security association.

1 34. (Currently Amended) ~~The method of claim 15~~ A method of communicating with
2 a remote node, comprising:
3 establishing a secure link between a first security gateway and a second security
4 gateway, the remote node in communication with the second security gateway;
5 sending at least one ping message to the remote node over the secure link and
6 through the second security gateway; and
7 monitoring for at least one ping reply from the remote node to determine if the
8 secure link is alive,
9 wherein establishing the secure link comprises establishing a secure link protected
10 according to a security protocol,
11 wherein sending the at least one ping message comprises sending at least one ping
12 message defined outside the security protocol,

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13 wherein sending the at least one ping message comprises sending the at least one
14 ping message protected according to the security protocol.

1 35. (Currently Amended) The method of claim [[15]] 34, wherein the security
2 protocol comprises an Internet Protocol Security protocol (IPsec), and wherein sending the at
3 least one ping message comprises sending the at least one ping message encrypted according to
4 an IPsec security association.

1 36. (Currently Amended) ~~The system of claim 18~~ A system for communicating
2 between a network element and a remote node, comprising:
3 a security module adapted to establish a secure link with the remote node, the
4 secure link having a security mechanism according to a security protocol; and
5 a keep-alive module adapted to send at least one ping message over the secure
6 link to the remote node, the at least one ping message defined outside the security protocol,
7 wherein the at least one ping message is protected according to the security
8 protocol.

1 37. (Currently Amended) The system of claim [[18]] 36, wherein the security
2 protocol comprises an Internet Protocol Security protocol (IPsec), and wherein the at least one
3 ping message is encrypted according to an IPsec security association.

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1 38. (Currently Amended) ~~The article of claim 27~~ An article comprising at least one
2 storage medium containing instructions for controlling communications, the instructions when
3 executed causing a controller to:
4 establish a secure link between a first node and a second node according to a
5 security protocol;
6 send at least one ping message targeting the second node over the secure link, the
7 at least one ping message defined outside the security protocol; and
8 monitor for at least one ping reply to determine if the secure link is alive,
9 wherein sending the at least one ping message comprises sending the at least one
10 ping message protected according to the security protocol.

1 39. (Currently Amended) The article of claim [[27]] 38, wherein the security protocol
2 comprises an Internet Protocol Security protocol (IPsec), and wherein sending the at least one
3 ping message comprises sending the at least one ping message encrypted according to an IPsec
4 security association.